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**Triggered Hf-178m2 Decay Burn-Up Demonstration**

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Beamline(s): X17B1

**Introduction:** Experimental evidence suggests that it is possible to trigger decay of the 31-year Hf-178m2 isomer using incident photons. Prolonged exposure to photons of the appropriate energy should trigger decay in enough Hf-178m2 isomer nuclei to create a measurable discrepancy in the expected activity of the isomer.

**Methods and Materials:** The Hf-178m2 target was encapsulated in beryllium held in an aluminum frame. Channels routed through the aluminum provide for water cooling during the irradiation. The target and a control target were assayed in the SRS Gamma Spectroscopy Laboratory before delivery to BNL. The target was irradiated in the X17B1 beamline for 97 hours. It was then returned to SRS for additional assays.

**Results:** A shift in the assay detector calibration had a negative effect on the reliability of the experiment. However, comparisons with the control target were still possible. No shift in expected activity is observed of a magnitude significantly greater than the measurement errors.

**Conclusions:** Procedures for a more reliable burn-up demonstration have been developed. It is estimated that 250 hours of irradiation time will be necessary in a repeat experiment to produce a statistically significant activity shift.